# Northern Rockies
# Fire Weather
# Operating Plan

May 2004

**Photo courtesy of Ron Hvisdak, USDA Forest Service-Kootenai NF**

**NWS Billings**
**NWS Glasgow**
**NWS Great Falls**
**NWS Missoula**
**NWS Spokane**

# SIGNATORY PAGE

Steve Brueske, Meteorologist in Charge
State Liaison
WFO Great Falls
Western Region
National Weather Service
National Oceanic and
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Date: _____

Brian Shiplett, Chair
Northern Rockies Coordinating Group
Montana Fire Wardens Association
Montana Disaster and Emergency Services Division
Montana Department of Natural Resources
and Conservation
Idaho Department of Lands
North Dakota Forest Service
Fish and Wildlife Service
National Park Service
Bureau of Indian Affairs
Bureau of Land Management
USDA Forest Service
Montana Fire Chief's Association

Date:_____

# Northern Rockies Fire Weather Operating Plan

**Index**



For Local Information See Individual Office Sections

## FIRE WEATHER PRODUCTS

National Weather Service (NWS) offices provide a suite of scheduled and unscheduled meteorological products to support land management agencies. Scheduled products may include daily narrative forecasts, outlooks and discussions, presuppression and numerical forecasts. These are generally produced for spring burning, wildfire season and fall burning. Unscheduled products include fire weather watches, red flag warnings and spot forecasts. These are available upon request 24 hours a day throughout the year.

In general, services are provided without charge to land management agencies. However, if a meteorologist is required to stay at the office on overtime, or requested to return to the office to issue a special fire weather product, the requesting agency will be charged for the overtime incurred as outlined in the National Agreement.

The Billings, Glasgow, Great Falls, Missoula and Spokane NWS offices will issue detailed forecasts to fire control agencies in the area encompassing Montana, portions of northcentral Idaho, and north-central Wyoming. The descriptions of the fire weather districts can be found in the individual sections for each office. Agencies served include: USDA Forest Service, Bureau of Land Management, Bureau of Indian Affairs, Montana Department of Natural Resources and Conservation, Idaho Department of State Lands, National Park Service, United States Fish and Wildlife in Montana and Idaho, Divisions of Environmental Quality, and county and local agencies.

### FORECAST TYPES

1. Morning forecast
2. Afternoon forecast
3. Spot forecasts
4. Red flag warnings and fire weather watches
5. Updates to all products as conditions warrant
6. Numerical Forecasts for NFDRS (Provided by Spokane and Missoula only)
7. Smoke Management Forecasts

### FORECAST DISSEMINATION

1. Narrative forecasts, forecast updates, red flag warnings, and fire weather watches. These products will be entered into the Weather Information Management System (WIMS), and will also be available on the Internet.

2. Spot Forecasts.
   The dissemination method of spot forecasts will be via the Internet; backup will be phone and fax.

3. Backup Procedures

a. Office Backup

| **Office** | **Primary Backup** | **Secondary Backup** |
|---|---|---|
| Billings | Glasgow | Riverton |
| Missoula | Great Falls | Spokane |
| Great Falls | Missoula | Glasgow |
| Glasgow | Billings | Great Falls |
| Spokane | Pendleton | Missoula |

b. Product Dissemination

WIMS continues to be the official method of dissemination for fire weather products. The Internet is also a widely used method of product retrieval.

c. Following are the Internet sites for each office:

http://www.wrh.noaa.gov/Billings
http://www.wrh.noaa.gov/Missoula
http://www.wrh.noaa.gov/Glasgow
http://www.wrh.noaa.gov/Spokane
http://www.wrh.noaa.gov/Greatfalls

## FORECAST ELEMENT DESCRIPTIONS

Standard dictionary definitions will apply to most terms used in fire weather forecasts. Basic weather terms will be used to call special significance to the "state of the atmosphere." A list of Fire Weather Terminology is included in this plan.

**Headlines:** This section is included when critical weather elements are expected during the forecast period. These elements include Fire Weather Watches, Red Flag Warnings, thunderstorms, significant precipitation, unusually low humidities, gusty winds, etc.

**Weather Discussion:** The weather discussion provides an understanding of the general weather pattern and its impact on expected weather. The discussion will accentuate the most important portions of the forecast such as the problem of the day and important features of the first four forecast periods.

**General Weather:** Expected sky cover and precipitation events are the primary elements given in the general weather. It may also highlight elements such as dry thunderstorms, winds, temperatures, and humidities that are particularly significant to field personnel.

**Lightning Activity Level (LAL):** This is a scale of lightning activity in a specific area. The LAL is outlined in USDA Forest Service General Technical Report INT-39 (October 1977).

**Chance of Wetting Rain (CWR):** A percentage will be used to indicate the likelihood of a wetting rain occurring over a forecast zone. Wetting rain is defined as 0.10 inches or more of rain over a major portion of the forecast zone. Chance of wetting rain (CWR) given on a spot forecast indicates the probability of receiving 0.10 inches or more of rainfall over the smaller scale area concerned.

**Temperatures:** The expected daily high and low temperature will be forecast in the range of values such as: "Highs today 82-92."

**Humidity:** The expected daily minimum and nighttime maximum humidities will also be forecast in a range of values, i.e., Minimum RH 15-25%.

**Slope/Valley Winds:** These are 10-minute average winds measured at 20 feet above ground, or average vegetation (standard RAWS). Also known as "surface winds," these may be highly variable across a forecast zone. Because of this, winds in the daily narrative forecasts will normally be quite general.

**Ridge Top Winds:** These are the surface winds experienced at the ridge tops. They are generally stronger than the slope and valley winds.

**Mixing Height:** Mixing height is a forecast of the altitude in which the atmosphere will be well mixed. The forecast will reflect the diurnal change between the highest mixing height (generally occurring in the afternoon) and the lowest mixing height (generally occurring during the early morning hours). Mixing height information will be given in either above Mean Sea Level (MSL) heights or Above Ground Level (AGL) heights. AGL height is the distance upward in the atmosphere above a given point. MSL height refers to a height in the atmosphere in relation to sea level, which would be uniform over an entire area. MSL is useful in complex terrain because on days with good mixing conditions, smoke will tend to rise to a uniform elevation in the atmosphere, regardless of the fire's elevation. To determine an AGL height from an MSL height forecast, subtract the elevation location of the fire from the MSL height.

**Mixing Winds:** A measure of the average wind speed and direction within a mixing depth.

**Haines Index:** The Haines Index information will be included in the narrative forecasts. This index of basic lower atmospheric stability and moisture seems to correlate well with large fire growth. One note of caution, wind is not factored into the Haines Index. The Haines Index is categorized as follows:

| Haines Index | Category |
|---|---|
| 2 or 3 | Very Low |
| 4 | Low |
| 5 | Moderate |
| 6 | High |

**Extended Forecast and Outlook:** An extended forecast (3 to 7 days) will be included with every Pre-suppression (General) Forecast. The outlook (from 8 to 10 or 14 days) will be available. The purpose of this guidance is to highlight major changes as well as general weather trends.

**Note:** For the 30/90-Day and Seasonal Outlooks, please go to the Climate Prediction Homepage at:
http://www.cpc.ncep.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks/color/page2.gif
These products are typically updated around the middle of the month.

## FIRE WEATHER PLANNING FORECAST FORMAT

```
FNUS5i KNNN DDHHMM
FWFNNN

MORNING/AFTERNOON FIRE WEATHER PLANNING FORECAST
NATIONAL WEATHER SERVICE CITY STATE
TIME-DATE (example: 900 AM MDT TUE AUG 8 2003)

...HEADLINE... (REQUIRED for Red Flag Warnings and Fire Weather Watches)

DISCUSSION...
_____________________________________________________________________
SSZXXX-XXX>XXX-DDHHMM- (UGC/FIPS CODING)
GEOGRAPHICAL DESCRIPTORS
TIME-DATE (example: 900 AM MDT TUE AUG 8 2003)

RED FLAG WARNING/FIRE WEATHER WATCH HEADLINE (as needed in each
appropriate zone grouping)

TODAY...

SKY/WEATHER.............
MAX TEMPS...............
  24 HR TREND..........(Optional)
MIN RH..................
  24 HR TREND..........(Optional)
WIND.(Wind defn........(include definition of wind, e.g. 20 FT/10-min avg)
                        (slope/valley...general wind...etc.)
                        (Ridge top...etc.)
LAL.....................(Optional)
HAINES INDEX............(Optional)
MIXING HEIGHT...........(Optional)
MIXING WINDS............(Optional)
CWR.....................(Optional)

TONIGHT...

SKY/WEATHER.............
MIN TEMPS...............
 24 HR TREND............
MAX RH..................
 24 HR TREND............
WIND.(Wind defn........(include definition of wind, e.g. 20 FT/10-min avg)
                        (slope/valley...general wind...etc.)
                        (Ridge top...etc.)
LAL.....................(Optional)
HAINES INDEX............(Optional)
MIXING HEIGHT...........(Optional)
MIXING WINDS............(Optional)
CWR.....................(Optional)

TOMORROW...

SKY/WEATHER.............
MAX TEMPS...............
  24 HR TREND..........(Optional)
```

```
MIN RH.................
  24 HR TREND.........(Optional)
WIND.(Wind defn........(include definition of wind, e.g. 20 FT/10-min avg)
                       (slope/valley...general wind...etc.)
                       (Ridge top...etc.)
LAL.....................(Optional)
HAINES INDEX............(Optional)
MIXING HEIGHT...........(Optional)
MIXING WINDS............(Optional)
CWR.....................(Optional)
_____________________________________________________________________
.FORECAST DAYS 3 THROUGH 7
Winds included days 3-5; other elements per locally established policy.
_____________________________________________________________________
=
$$
Forecast for next geographical descriptor and fire weather zone group.
_____________________________________________________________________
.OUTLOOK...(Optional) Time frame and format may differ per local
established policy. The time frame will be described in the forecast,
i.e., 8 to 10 day outlook.
_____________________________________________________________________
=
$$
```

## SMOKE MANAGEMENT FORECASTS

Mixing height and mixing winds are optional elements in general forecasts during the spring burning period, wildfire season and fall burning period. This information may also be provided in a stand-alone smoke management forecast at those times a fire weather forecast is not being produced, i.e., early spring and late fall.

Following is the format for the smoke management forecast:

```
SMOKE MANAGEMENT FORECAST
DISCUSSION...

TODAY:
     MIXING HEIGHT:
     MIXING WINDS:

TONIGHT:
     MIXING HEIGHT:
     MIXING WINDS:

TOMORROW:
     MIXING HEIGHT:
     MIXING WINDS:
```

## NFDRS FORECASTS

National Fire Danger Rating System (NFDRS) forecasts are provided on a daily basis from late spring until the end of wildfire season.

Afternoon observations (1400 LDT) should be sent from the field to WIMS by 1415 LDT. These observations will generally be received in the Forecast Office by 1445 LDT.

The forecasts will then be sent to WIMS by 1600 MDT. Forecasted NFDRS indicies should be available by 1615 MDT.

These forecasts are for expected conditions 24 hours from the current day's observation (1400 LDT tomorrow).

Following is an explanation of codes used in NFDRS Forecasts:

FCST,STATION#,YYMMDD,13,WX,TEMP,RH,,,,WIND,,TX,TN,Rhx,RHn,PD1, PD2,WETFLAG

SAMPLE:

FCST,101037,030425,13,2,57,37,,,,11,,56,40,75,42,4,0,N
FCST,100708,030425,13,2,56,49,,,,07,,55,42,83,48,0,0,N
FCST,240119,030425,13,2,46,77,,,,11,,55,33,98,58,0,0,N
FCST,240223,030425,13,2,47,78,,,,14,,55,30,100,59,0,0,N
FCST,241308,030425,13,2,47,69,,,,07,,54,34,94,56,0,2,N
FCST,241211,030425,13,2,55,59,,,,09,,62,41,84,46,0,0,N
FCST,241513,030425,13,2,56,53,,,,08,,63,41,77,45,0,0,N
FCST,242907,030425,13,2,52,56,,,,09,,60,36,78,51,0,0,N
FCST,245405,030425,13,2,46,70,,,,10,,55,32,79,59,0,0,N
FCST,243206,030425,13,2,46,84,,,,08,,51,30,90,63,0,0,N

FCST: Indicates individual site forecasts.

STATION#: NFDRS site number

YYMMDD: Date

13: Valid Forecast Time (Always 13 to indicate 1300 LST)

WX: Weather valid at 1300 LST tomorrow.

Valid entries are:

0 clear
1 scattered clouds (1/8 to 4/8)
2 broken clouds (5/8 to 7/8)
3 overcast clouds (more than 7/8)
4 foggy
5 drizzle
6 raining
7 snowing or sleeting
8 showers (in sight or at the station)
9 thunderstorm
(Categories 5, 6, 7 sets most NFDRS indices to 0.
ERC is the exception)

TEMP: Temperature in degrees F valid at 1300 LST

RH: Relative humidity in percent valid at 1300 LST

WIND: Wind speed in mph valid at 1300 LST

TX: Maximum temperature from 1300 LST to 1300 LST tomorrow

TN: Minimum temperature from 1300 LST to 1300 LST tomorrow

Rhx: Maximum RH from 1300 LST to 1300 LST tomorrow

Rhn: Minimum RH from 1300 LST to 1300 LST tomorrow

PD1: Precipitation duration in hours 1300 LST to 0500 LST

PD2: Precipitation duration in hours 0500 LST to 1300 LST

WETFLAG Y or N: Indicates whether fuels will be wet at 1300 LST.

## SPOT PRODUCTS

1. Spot Forecasts

   Spot forecasts will be issued for wildfires, prescribed burns, or other incidents when requested. Requests for special forecasts should be made directly to the National Weather Service office serving your area. Whenever a spot forecast request is sent, a phone call to the weather office should be made to inform the forecaster of the request.

   Please furnish the data indicated on the Internet version of the Spot Forecast Request Form to your local NWS office. This form can be found on the Homepage of each NWS office, Fire Weather section. Where access to the Internet is not available, call your local National Weather Service office.

   Weather observations supporting a spot forecast request should be taken at the site of the incident, fire, or burn. The quality of the forecast will greatly depend on the accuracy of this observation. Observations taken the day of the planned burn are essential for a good forecast. In addition, if site observations from the previous day are available, please provide these to the forecaster. If possible, contact the fire weather forecaster a few days prior to the burn, to coordinate weather data collection and forecast requirements. A map of the burn will also help the forecaster tailor the forecast to your specific location.

If weather conditions develop which are not forecast and may threaten the success of the operations at the fire, the forecaster should be notified immediately. Timely feedback concerning the accuracy of forecasts will assist the forecaster greatly in the preparation of more accurate forecasts in the future.

2. Spot Forecast Format

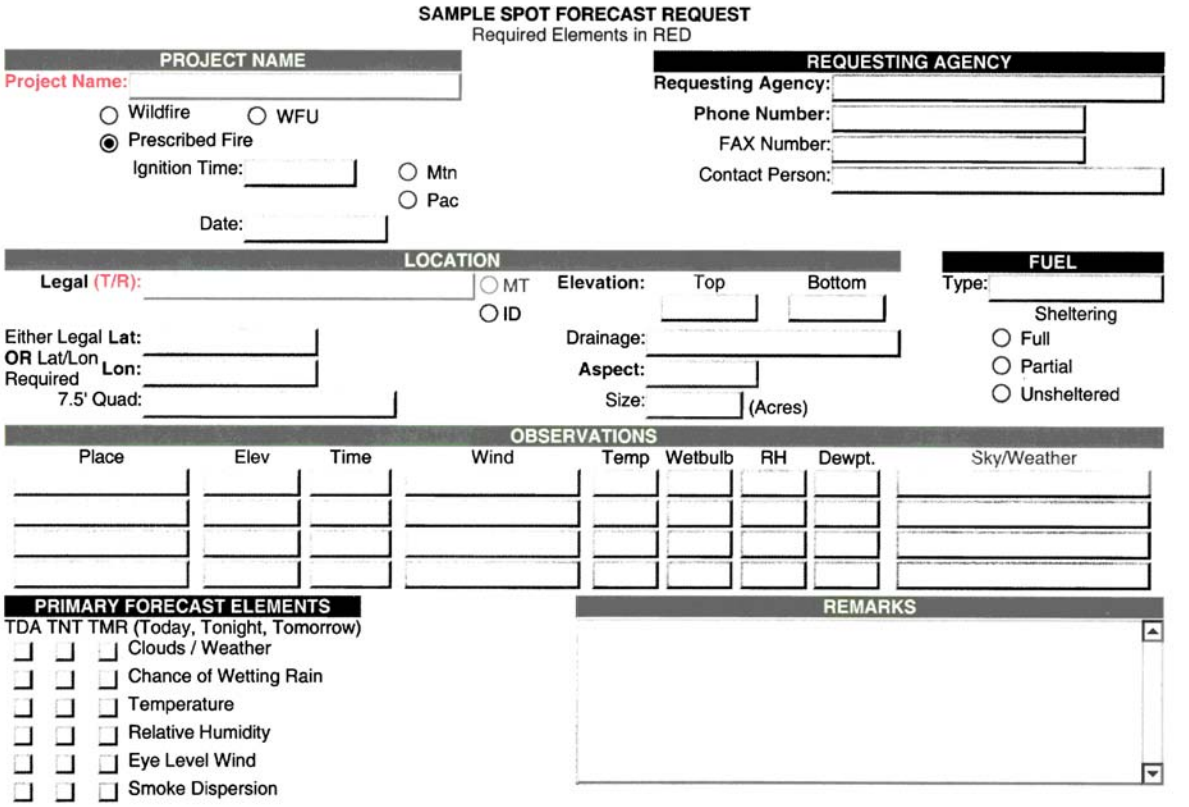
a. Spot forecasts for wildfires will contain a discussion and all primary weather elements.

b. Prescribed fire spot forecasts will always include a discussion. In addition, these forecasts will contain any weather elements chosen by the requestor to make operational decisions on the project.

3. Spot Forecast Example

```
FNUS7i KMSO DDHHMM
FWSMSO

SPOT FORECAST FOR (location or name of burn)
REQUESTED BY (name of requester)

NATIONAL WEATHER SERVICE MISSOULA MT
(800 AM MDT TUE AUG 8 2003)

IF CONDITIONS BECOME UNREPRESENTATIVE, CONTACT THE NATIONAL
WEATHER SERVICE

...HEADLINE...

DISCUSSION...

FOR TODAY
 SKY/WEATHER.............
 TEMPERATURE.............MAX xx
 HUMIDITY................MIN xx%
 WIND...EYE LEVEL.......xx MPH
 CWR.....................xx%


FOR TONIGHT
 SKY/WEATHER.............
 TEMPERATURE.............MAX xx
 HUMIDITY................MIN xx%
 WIND...EYE LEVEL.......xx MPH
 CWR.....................xx%

OUTLOOK FOR TOMORROW
 SKY/WEATHER.............
 TEMPERATURE.............MAX xx
 HUMIDITY................MIN xx%
 WIND...EYE LEVEL.......xx MPH
 CWR.....................xx%

FORECASTER...
```

EXAMPLE SPOT REQUEST



**SAMPLE SPOT FORECAST REQUEST**
Required Elements in RED

**PROJECT NAME**
Project Name:
○ Wildfire ○ WFU
◉ Prescribed Fire
Ignition Time: ○ Mtn ○ Pac
Date:

**REQUESTING AGENCY**
Requesting Agency:
Phone Number:
FAX Number:
Contact Person:

**LOCATION**
Legal (T/R): ○ MT ○ ID
Elevation: Top Bottom
Either Legal Lat:
OR Lat/Lon Required Lon:
7.5' Quad:
Drainage:
Aspect:
Size: (Acres)

**FUEL**
Type:
Sheltering
○ Full
○ Partial
○ Unsheltered

**OBSERVATIONS**

| Place | Elev | Time | Wind | Temp | Wetbulb | RH | Dewpt. | Sky/Weather |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

**PRIMARY FORECAST ELEMENTS**
TDA TNT TMR (Today, Tonight, Tomorrow)
☐ ☐ ☐ Clouds / Weather
☐ ☐ ☐ Chance of Wetting Rain
☐ ☐ ☐ Temperature
☐ ☐ ☐ Relative Humidity
☐ ☐ ☐ Eye Level Wind
☐ ☐ ☐ Smoke Dispersion

**REMARKS**

## WARNING PRODUCTS

1. Fire Weather Watch and Red Flag Warning Definitions

The possibility of severe fire weather must be communicated to fire control agencies in a prompt and informative manner.

A **Fire Weather Watch** will be issued if a significant potential exists for red flag conditions, and the fire danger category is High, Very High, or Extreme. Fire Weather Watches will be available in WIMS and the Internet.

A Fire Weather Watch will normally be issued 12 to 48 hours but not more than 72 hours in advance of the expected onset of the red flag conditions. They will often be issued in conjunction with the routine morning or afternoon forecasts. However, a Watch may be issued at anytime with the use of a special statement. At this time, the Fire Weather Forecast will be updated as well. The area(s) affected, the time of the expected onset of the conditions, and an explanation of those conditions will be included in the Watch. A Watch may be issued (or continued) the first 12 hours for dry lightning.

Fire Weather Watches will be canceled if and when subsequent meteorological information indicates the red flag conditions are no longer a threat. This cancellation will be sent by a special Red Flag Statement.

A **Red Flag Warning** will be issued to indicate the imminent danger of severe fire weather or when severe fire weather already exists.

This product will be issued whenever red flag conditions are imminent and the fire danger category is High to Extreme. Red Flag Warnings will be available in WIMS and the Internet

The Red Flag Warning will generally be issued within 24 hours of the expected onset of Red Flag conditions. The warning will also be issued by a special statement and reflected in the headline of the forecast. The affected area, the valid time of the warning, and a description of the expected severe fire weather conditions will be included.

A special Red Flag Statement will be used to cancel a red flag warning and the Fire Weather Forecast will be updated.

2. Red Flag Conditions:

   One or more of the following conditions, in conjunction with the High, Very High, or Extreme Fire Dangers, will be considered for Red Flag events.

   a. Scattered dry thunderstorms. (A lightning storm accompanied by less than a wetting rain, 0.10 inch precipitation or less, often with very gusty winds.)

   b. Increased thunderstorm activity, wet or dry, during an extremely dry period.

   c. Strong or gusty surface winds, or abrupt change in direction due to the approach and passage of a cold front, squall line, or other weather phenomena other than isolated thunderstorms. General criteria would be sustained winds increasing to 20 mph or higher with gusts to 35 mph or greater. However, check individual office sections for local criteria.

   d. Anytime the forecaster foresees a change in weather that would result in a significant increase in fire danger.

3. Example Red Flag Warning
   (Fire Weather Watches will follow the same format)

```
WWUS8i KMSO DDHHMM
RFWMSO

RED FLAG WARNING
NATIONAL WEATHER SERVICE MISSOULA MT
1116 AM MDT TUE AUG 8 2003

MTZ104>107-DDHHMM-

...RED FLAG WARNING FOR STRONG NORTHWEST WINDS THROUGH THIS EVENING
   IN NORTHWEST MONTANA.

FIRE WEATHER ZONES INCLUDED IN THIS WARNING ARE:
104...105...106...107 (Optional)

**************************************************************
DISCUSSION: THE NATIONAL WEATHER SERVICE HAS ISSUED A RED
FLAG WARNING FOR STRONG NORTHWEST WINDS THROUGH THIS
EVENING IN NORTHWEST MONTANA. NORTHWEST WINDS 20 T0 30 MPH
WILL DEVELOP BY NOON...AND PERSIST THROUGH THIS EVENING
ACROSS NORTHWEST MONTANA. THE WINDS ARE THE RESULT OF A
STRONG COLD FRONT MOVING THROUGH THE AREA...ALONG WITH AN
UPPER JET DIVING OUT OF BRITISH COLUMBIA.

THE JET WILL MOVE EAST OF THE AREA THIS EVENING...AND THE
SURFACE PRESSURE GRADIENT WILL BEGIN TO RELAX.
```

4**.** Public Watches, Warnings and Statements

Watches, warnings, and statements of potential severe or unusual weather events, that are not directly related to fire weather, are also issued by NWS offices. These statements, however, may still contain weather information significant to field personnel. Therefore, it would be beneficial to stay in tune with public weather forecasts. This is especially true during the spring and fall when fire weather planning forecasts are only produced once a day.

## METEOROLOGICAL SERVICES

### INCIDENT METEOROLOGIST (IMET)

Onsite weather support to large wildfires, prescribed fires, and other major incidents is available. For incidents in the NWS Billings, NWS Glasgow, NWS Great Falls, NWS Missoula, and NWS Spokane (Idaho Panhandle NF) Fire Weather Districts, orders for Incident Meteorologists (IMET) and supporting equipment will be directed through the Northern Rockies Coordination Center. Conditions of these special dispatches are in the National Agreement for Meteorological Services contained in this operating plan.

### LIAISON

The Fire Weather Program Leaders will visit a portion of their Districts annually for familiarization, liaison, and program coordination. Fire Weather Program Leaders will be open to discuss any forecast problems, proposed prescribed burning plans in respect to weather needs, and any weather anomalies peculiar to their area. Ample notification will be provided prior to any visitation.

### TRAINING

Fire Weather forecasters are available for training courses, workshops, and seminars. When requesting a forecaster for these events, please give as much advance notification as possible. Per diem and travel costs will be billed to the requesting Agency, as outlined in the National Agreement for Meteorological Services. For the assistance of a forecaster, please contact the Fire Weather Program Manager of your servicing office.

### NOAA WEATHER RADIO BROADCASTS

The NWS offices provide continuous broadcasts of public weather forecasts and warning information via NOAA Weather Radio (NWS) but fire weather products are not included. The reception varies and is limited to line-of-sight. The information received over the NWS should be used ONLY as a supplement to the fire weather products prepared for your area.

Standard Nationwide NWS Frequencies (MHz) are:

162.400 162.425 162.450 162.475 162.500 162.525 162.550

Following are local frequencies:

| Frequency | Area Covered |
|---|---|
| 162.550 MHZ | Baker, MT |
| 162.550 MHZ | Billings, MT |
| 162.550 MHZ | Boise, ID |
| 162.500 MHZ | Bonners Ferry, WA |
| 162.500 MHZ | Bozeman, MT |
| 162.425 MHZ | Broadus, MT |
| 162.450 MHZ | Browning, MT |
| 162.550 MHZ | Butte, MT |
| 162.550 MHZ | Circle, MT |
| 162.500 MHZ | Conrad, MT |
| 162.400 MHZ | Dickinson, ND |
| 162.475 MHZ | Dillon, MT |
| 162.400 MHZ | Glasgow, MT |
| 162.475 MHZ | Glendive, MT |
| 162.450 MHZ | Grangeville, ID |
| 162.550 MHZ | Great Falls, MT |
| 162.400 MHZ | Havre, MT |
| 162.400 MHZ | Helena, MT |
| 162.500 MHZ | Jordan, MT |
| 162.550 MHZ | Kalispell, MT |
| 162.400 MHZ | Lethbridge, AB |

| Frequency | Area Covered |
|---|---|
| 162.550 MHZ | Lewiston, ID |
| 162.500 MHZ | Lewistown, MT |
| 162.525 MHZ | Livingston, MT |
| 162.475 MHZ | Malta, MT |
| 162.475 MHZ | McCall, ID |
| 162.550 MHZ | Medicine Hat, AB |
| 162.400 MHZ | Miles City, MT |
| 162.400 MHZ | Missoula, MT |
| 162.400 MHZ | Pendleton, OR |
| 162.475 MHZ | Plentywood, MT |
| 162.550 MHZ | Pocatello, ID |
| 162.550 MHZ | Poplar, MT |
| 162.550 MHZ | Rapid City, SD |
| 162.400 MHZ | Red Lodge, MT |
| 162.475 MHZ | Scoby, MT |
| 162.550 MHZ | Sheridan, WY |
| 162.400 MHZ | Spokane, ID |
| 162.550 MHZ | Swift Current, SK |
| 162.400 MHZ | Twin Falls, ID |
| 162.550 MHZ | Williston, ND |

## WIMS ID CONTACT

All fire weather stations have been assigned numbers to be used as the identification number when entering into the Weather Information Management System (WIMS). If a new station is established, or a present station moved, a new identification number should be requested from the Fire Weather Program Leader of your servicing NWS office.

The request should include:

- Station Name,
- Type of Station,
- State,
- County,
- Latitude/Longitude,
- Legal (township, range, section),
- Elevation, and
- Operating Agency

The Fire Weather Program Leader will contact Meteorological Services Division at the NWS Western Region Headquarters in Salt Lake City, as well as send a copy to the Regional Remote Automated Weather Station Coordinator.

Department of Commerce • National Oceanic & Atmospheric Administration • National Weather Service

***NATIONAL WEATHER SERVICE INSTRUCTION 10-406***
***NOVEMBER 7, 2002***

***Operations and Services***
***Fire Weather Services, NWSPD 10-4***

***Interagency Agreement for Meteorological Services Among the Bureau of Land Management, Bureau of Indian Affairs, U.S. Fish and Wildlife Service, and National Park Service of the U.S. Dept. of Interior; the Forest Service of the U.S. Dept. of Agriculture; and the National Weather Service of the U.S. Dept. of Commerce***

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NOTICE: This publication is available at: http://www.nws.noaa.gov/directives/.

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**OPR:** OS22 (D. Billingsley) Certified by: OS22 (J. Lee)
**Type of Issuance**: Initial.

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***SUMMARY OF REVISIONS:*** Together with NWSPD 10-4, this directive supersedes WSOM Chapter D-06, “Fire Weather Services Program ”, Issuance 91-11, dated August 22, 1991; OM L 03-95, dated April 27, 1993; and OM L 04-99, dated September 9, 1999.

signed 11/07/02
Gregory A. Mandt Date
Director, Office of Climate, Water, and Weather Services

**INTERAGENCY AGREEMENT**
**for**
**METEOROLOGICAL SERVICES**
Among the
Bureau of Land Management
Bureau of Indian Affairs
U.S. Fish and Wildlife Service
National Park Service
of the
United States Department of the Interior
and the
Forest Service
of the
United States Department of Agriculture
and the
National Weather Service
of the
United States Department of Commerce

BLM Agreement No. 1422RAI02-0030
BIA Agreement No.
FWS Agreement No.
FS Agreement No. 02-IA11130206041
NPS Agreement No.
NWS Agreement No. 201-02-002

## 1.0 INTRODUCTION.

Fire management and suppression in the nation's wildlands is an on-going concern to the American public and to the Department of the Interior's Bureau of Land Management, Bureau of Indian Affairs, Fish and Wildlife Service, and National Park Service, and the Department of Agriculture, Forest Service, as well as to the Department of Commerce, National Oceanic and Atmospheric Administration-National Weather Service (NWS). Considerable cooperation and coordination among these agencies exists, which is critical to the success of fire management, suppression and safety. This agreement will refer to the National Weather Service as "NWS" and the federal wildland fire management agencies as the "Interagency Wildland Fire Agencies."

The National Weather Service is legally mandated to issue weather forecasts and warnings for the protection of life and property. The Interagency Wildland Fire Agencies are responsible for the stewardship and/or protection of lands owned or held in trust by the United States or

under the jurisdiction of state agencies.

The NWS and Interagency Wildland Fire Agency responsibilities are defined in Section 5. The NWS Weather Forecast Office (W FO) products and services shall be focused on respective County Warning Forecast Areas (CW FA) for the operational concerns of local wildland fire agency districts, while Interagency Wildland Fire Agencies shall focus on geographic area and national level products and services. The needs of geographic areas are met using a geographic area Memorandum of Understanding and/or geographic specific Annual Operating Plan (AOP) - (see appendix 1 for a suggested outline), and this Interagency Agreement. The NWS and Interagency Wildland Fire Agencies will coordinate and cooperate on developing fire weather policy, standards and guidelines.

## 2.0 AUTHORITIES.

A. Economy Act of June 30, 1932 (47 Stat. 417; 31 U.S.C. 1535), as amended.

B. Travel Authority (5 U.S.C. 5702).

C. Organic Act of 1890 (15 U.S.C. 313).

D. Joint Project Authority (49 U.S.C. 44720).

E. Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701 et seq.).

F. National Park Service Organic Act of August 1916 (16 U.S.C. 1).

G. National Wildlife Refuge Administration Act of June 27, 1998 (16 U.S.C. 668dd)

H. Disaster Relief Act of 1974 (42 U.S.C. 5147).

I. National Indian Forest Resources Management Act of 1990 (25 U.S.C. 3101 et seq.).

J. Cooperative Forestry Assistance Act of 1978 (P.L. 95-313, 92 Stat. 365 as amended; 16 U.S.C. 2101 (note), 2101-2103, 2103a, 2103b, 2104-2105).

K. Federal Fire Prevention and Control Act of October 29, 1974, (P.L. 93-498, 15 U.S.C. 2201 et seq., 88 Stat 1535.)

## 3.0 PURPOSE.

The purpose of this Inter-Agency Agreement is to combine resources and provide complementary services without duplication to best serve the needs of the public and all agencies for the protection of life, property and resource values to enhance ecosystem health. Accurate and timely meteorological and fire danger information is required to manage these resources effectively and efficiently. It is also the purpose of this Agreement to set forth the terms and conditions under which the NWS will continue to provide meteorological services to support these efforts as requested by the Interagency Wildland Fire Agencies. It is with this knowledge that this Inter-Agency Agreement is entered into.

This Agreement supersedes the National Agreement for Meteorological Services in Support of Agencies with Land Management and Fire Protection Responsibilities" among the six participating agencies, as listed above, that was effective June 1983.

## 4.0 OBJECTIVES.

The objectives of this Agreement are:

A. To identify meteorological services to be provided;

B. Establish interagency relationships; and

C. Define obligations of the NWS and Interagency Wildland Fire Agencies.

## 5.0 RESPONSIBILITIES.

The responsibilities listed are not all-inclusive, but are meant to provide the overall scope of services provided by the respective agencies.

A. The National Weather Service agrees to:

All obligations undertaken by the NWS under this Agreement are subject to the availability of appropriated funds.

1. Provide Basic Meteorological Services: Basic Meteorological Services will be provided in accordance with the Annual Operating Plan (AOP) for Fire Weather Service for designated NWS offices. These services will be made available without cost to Interagency Wildland Fire Agencies and will include:

a. Routine fire weather forecast and updates during the designated period outlined in the AOP.

b. Extended and long-range weather and climate outlooks.

c. NWS weather observations.

d. Fire Weather Watch and Red Flag Warning program.

e. Site-specific forecasts for wildland fires or special federal projects (i.e. spraying, seeding, fuels management, or search and rescue operations).

f. Provide consultation and technical advice in support of basic services to Interagency Wildland Fire Agencies.

g. Provide weather information to a central communication gateway and the internet for Interagency Wildland Fire Agencies' use and further distribution.

h. Provide a cadre of Incident Meteorologists (IMET) in support of the fire weather program.

I. Maintain a current list of offices providing basic meteorological services.

j. National scale short-range fire weather outlooks.

2. Non-Routine Services: These services will be provided by designated NWS offices. Expenses above planned salary and operating costs will be borne by the benefitting agency.

   a. Weather Observer training.

   b. Weather observation station visits.

   c. Participation in Wildland Fire Agency training.
      1. Course development.
      2. Classroom instruction.

   d. On-site meteorological services.

   e. Other special fire management services.

3. Fire Weather Training: The NWS recognizes the need for specialized training in fire weather meteorology for forecasters. Costs associated with training NWS staff will be borne by NWS. The NWS will meet this need as follows:

    a. The NWS will ensure all meteorologists producing fire weather products have met the minimum fire weather forecaster training requirements.

    b. The NWS will provide specialized training for the purpose of qualifying NWS IMETs.

4. Participation in interagency groups: All NWS costs will be borne by NWS.

5. Wildland fire suppression related activities: The NWS will not charge an administrative surcharge or any other expenditure that is not authorized under the Wildland Fire Agencies' Appropriation Acts related to these activities.

B. Interagency Wildland Fire Agencies

Wildland Fire Agencies' programs provide Geographic Area and national products for the strategic role of resource prioritization and utilization. Specific responsibilities of Wildland Fire Agencies are listed below.

1. Operational Support and Predictive Services

    a. Geographic Area and national level fire weather products, services and assessments will be provided for resource allocation and prioritization.

    b. Integration of weather and climatic sciences into Geographic Area Coordination Center (GACC) operations.

    c. Develop value-added products to enhance short and long-range outlooks and projections.

    d. Provide weather briefings to GACC and NIFC Coordinators and Multiagency Coordinating Groups.

    e. Manage weather and climatology portions of GACC web site.

f. Manage agency fire weather infrastructure.

g. Smoke management.

2. Program Management

   Program management of federal land management and fire agencies' fire weather responsibilities, which includes:

   a. Program coordination with state agencies.

   b. Programmatic guidance, evaluation and certification.

   c. Advice and staff support to Fire Directorate.

   d. Manage weather station network.

   e. Liaison between field users and service providers.

   f. Participation in activity reviews.

3. Monitoring, Feedback and Improvement

   a. Transmit feedback to product and service providers.

   b. Suggest improvements to providers of products and services received.

   c. Advise agencies on quality control of weather observations.

   d. Coordination with NWS and users in assessment and evaluation of program effectiveness.

   e. Fire weather expertise in accident/incident investigations.

4. Technology Transfer

   a. Transfer meteorology and climatology knowledge to field level personnel.

   b. Promote proper usage by agency personnel of weather and climate products and services.

   c. Conduct training/expertise needs assessment.

d. Coordinate data and technology acquisition.

e. Participation on training cadre.

5. Agency Computer Systems

   Where fire management computer systems are locally available, access to the systems will be granted to NWS to provide services, as needed. Costs will be borne by the Interagency Wildland Fire Agencies for requirements that are beyond the distribution of weather information through a central communications gateway.

6. Fire Weather Observations:

   a. Provide routine surface weather observations to NWS.

   b. Provide all equipment, equipment maintenance, inspection of weather observation sites, and data quality control.

   c. Pay all travel and per diem costs associated with Interagency Wildland Fire Agencies' requests for visits of NWS personnel to weather observing sites.

   d. Provide for collection, storage and retrieval of remote automatic weather stations (RAWS) data.

   e. Provide observations for site specific and other special forecasts.

7. On-Site Meteorological Support:

   a. Pay costs directly associated with on-site meteorological support by NWS personnel. This includes costs incurred by the NWS IMET duty station.

   b. Provide logistical and weather observation support to NWS personnel at onsite operations.

   c. Provide and pay costs associated with telecommunication services.

8. Training:

    a. Pay per diem and travel costs for NWS personnel instructing and providing course development in Wildland Fire Agency training.

    b. Provide technical assistance, instruction, and supporting material for NWS sponsored fire weather training sessions.

9. Other Non-Routine Services Interagency Wildland Fire Agencies will provide logistics support and pay all overtime, travel, and per diem costs of NWS personnel associated with the provision of all other special fire meteorological services, including Wildland Fire agency approved wildland fire familiarization for NWS personnel.

## 6.0 JOINT RESPONSIBILITIES:

NWS and Interagency Wildland Fire Agencies shall jointly prepare national and Geographic Area specific MOUs and/or AOPs for Fire Weather Services that will set policy and procedures at GACC, NIFC, state or forecast office level, and shall include:

A. Shared responsibilities of all participants shall include, but not limited to weather briefings, training, research, product/service verification as outlined in Geographic Area specific AOPs.

B. Provision for monitoring, feedback and improvement.

C. Procedure for documenting, monitoring and evaluating fire weather products, briefings and services delivered.

D. Provision for monitoring and evaluating advances in science and technology.

E. Provision for efficient means for technology transfer.

F. Provision for participation in fire weather research activities.

G. Provision that on-site IMET services may be provided by Interagency Fire Weather Meteorologist meeting NWS standards only when NWS IMETs are not available to meet Wildland Fire Agency resource requests on a national basis. The coordination for Interagency Fire Weather Meteorologists will be done between the NWS IMET coordinator and the National Interagency Coordination Center.

H. Provision that NWS meteorologists and Interagency Wildland Fire Agency meteorologists stationed at GACCs and at NIFC will work together to ensure fire agency decision makers receive consistent and coordinated fire weather products and services.

I. Provision that the NWS and Interagency Wildland Fire Agencies will jointly develop and share technology including meteorological software and data, Advance Technology Meteorological Units, portable weather stations, etc. to improve abilities and performance.

J. The NWS and Wildland Fire Agency meteorologists shall work closely in all phases of the fire weather forecast and warning program to resolve concerns and avoid potential inconsistencies in products and services prior to delivery to fire agency customers. The goal of all agencies is to maximize firefighter and public safety through a coordinated delivery of consistent services.

K. The Parties recognize that, given the current administrative process for payments for fire suppression activities, it is not feasible to obligate the full amount of funds that may be required by this Agreement, because the Agreement does not constitute a binding obligation under 31 U.S.C. § 1501 since it cannot anticipate the specific goods or services for which payment will be requested, or the individual payment amounts, in each future case. This information can only be provided by Resource Orders executed when the goods or services are requested. At the same time, the Parties recognize that Resource Orders are insufficient to constitute a binding obligation under the statute because there is no evidence of intent to be bound, no authorized signatures are present, and no legal authorities are cited. However, these requirements are satisfied by the Agreement. The two documents, when taken together, contain all the elements required for an obligation under the statute. Hence, the Parties agree that this Agreement shall automatically be incorporated by reference into any Resource Orders issued under it, and that an obligation of funds will occur at the time the NWS presents a copy of this Agreement and the Resource Orders for payment. The parties also agree to work toward a more efficient resolution of this administrative process for obligation and payment of fire suppression funds.

## 7.0 STATEMENT OF WORK.

Procedures for notification of and obtaining services from the NWS will be prepared and specified in the Annual Operating Plans (AOP) and/or in the MOUs for the Geographic Area Coordinating Centers, and in the Geographical Area and National Mobilization Guides. An electronic copy of the National

Mobilization Guide can be viewed via www.nifc.gov - select "National Interagency Coordination Center" – select "References" link to National Mobilization Guide.

## 8.0 TRANSFER OF FUNDS.

A. Billing and collection procedures will follow the Intra-governmental Payment and Collection (IPAC) system process.

B. Wildland Fire Suppression Activities: Transfers under this subsection are under the Disaster Relief Act, 42 U.S.C. § 5147. Reimbursable costs are estimated not to exceed a maximum of $2,000,000.00 per fiscal year. In the event this amount is insufficient for a particular fiscal year, this Agreement may be modified to increase the amount of funding, subject to the availability of funds. This Agreement is automatically incorporated by reference into any Resource Order that is issued under it, constituting a binding obligation. The Interagency Wildland Fire Agencies warrant that they will administratively reserve these funds to ensure that the funds will be available when the obligations are recorded. The recording of the obligations will occur upon the receipt of the billings from the NWS by the applicable Interagency Wildland Fire Agency. The billings, inclusive of copies of this Agreement, the Resource Order(s), and expenditure documentation, will define the specific services, supplied goods and costs for each order, and subsequent obligation and payment.

1. Reimbursement payments for suppression-related activities will be accomplished by submission of billings, which are inclusive of copies of the Resource Orders that define the requested services and goods, and the expenditure back-up documentation. The NWS will not charge an administrative surcharge or any other expenditure that is not authorized under the Wildland Fire Agencies' Appropriation Acts related to these activities.

2. It is the responsibility of the requesting agency/office to provide billing instructions to the NWS office that provided the service, which includes the items listed below. It is also the responsibility of the requesting agency/office to conduct any required verification of costs, authorization of expenditures and reconciliation of payment.

    a) The fire name, jurisdictional unit, and incident number (The copy of the Resource Order generally includes this information);

    b) Applicable support documentation requirements;

c) A copy of this Agreement complete with signatures;

d) Identification (name and phone number) of NWS financial contact;

e) Provide information to NWS regarding which payment center to send the billings for processing; and

f) Billings and support documentation are to be submitted to the appropriate payment center by the NWS within sixty-days of completion of service.

C. Non-Wildland Fire Suppression Activities: Obligation of funds and payments for non-wildland fire suppression activities that are included in the Annual Operating Plan (AOP) shall be accomplished by Task Orders against this Agreement between the concerned agencies by the responsible officers at the appropriate level operating within their authority.

1. All funding obligations must be placed against the individual agency/office's Task Order number and not against this Agreement number.

2. Task Orders to this Agreement may be approved and signed for the NWS by the Director, Office of Climate, Water and Weather Services.

3. Each federal agency shall make direct settlement from its own funds for all liabilities it incurs under this Agreement.

4. The NWS will not charge any agency that is signatory to this Agreement an indirect administrative surcharges for activities addressed in the respective Annual Operating Plan(s) and Geographical Area MOUs, and are requested through Task Orders or Resource Orders under the National Mobilization Guide.

5. Task Orders may be prepared in any format acceptable to the agencies involved in each project. At a minimum, each Task Order written in support of this Agreement will include the following items:

a) Detailed description of services to be done or supplies to be delivered;

b) Description of the deliverables;

c) Performance period for completion;

d) Cost estimates;

e) Identify responsible project officials for each Task Order agency;

f) Payment procedures (applicable billing procedures, identification of codes, method of payment— advance/reimbursement; and

g) Signature(s) by authorized personnel for each Task Order agency.

## 9.0 TERM OF AGREEMENT.

The terms of this Inter-agency Agreement shall become effective with and upon execution by NWS and any or all Interagency Wildland Fire Agencies and shall remain in effect for a period of five-years from the date the last signature was placed on the signatory section, or until such time as the Inter-agency Agreement is terminated by mutual agreement. Any signatory may terminate their participation in this Agreement by written notice to all other signatories provided that such notice shall be given between the dates of October 1 of any year and February 1 of the following year. Full credit shall be allowed for each party's expense and all non-cancelable obligations properly incurred up to the effective date of termination. The remaining signatories may continue the provisions of this Agreement as long as the NWS remains a signatory.

## 10.0 RESOLUTION OF DISAGREEMENT.

Should disagreement arise on the interpretation of the provisions of this Agreement, or modifications thereto, that cannot be resolved at the operating level, the area(s) of disagreement shall be stated in writing by each party and presented to the other party for consideration. If agreement on interpretation is not reached within thirty-days, the parties shall forward the written presentation of the disagreement to respective higher officials for appropriate resolution. Conflicts and/or disagreements that cannot be resolved at the regional (GACC) level will be elevated to the National Fire Weather Program Managers for the NWS and Interagency Wildland Fire Agencies. If the conflict cannot be resolved at the National Program Managers level, the conflict will be elevated to the Agency Director level (NWS and applicable Wildland Fire Agency Director) for final resolution.

## 11.0 GENERAL PROVISIONS.

A. Parties to this Agreement are not obligated to make expenditures of funds or provide services under terms of this Agreement unless such funds are appropriated or services are authorized by either the State Legislatures or the Congress of the United States, or are otherwise available under Section 101 and 102 of the Annual Appropriations Act for Interior and Related Agencies.

B. The points of contact listed in Section 13 will review this Agreement annually.

C. Modifications to this Agreement may be initiated by any signatory agency. The modifications shall not take effect until documented and signed by all signatory agencies.

   1. The BLM is designated as the agency responsible for all administrative oversight of modifications to this agreement.

   2. Modifications to this Agreement may be approved for the NWS and signed by the Director, Office of Climate, Water and Weather Services, or pursuant to NWS protocol.

D. The signatory Interagency Wildland Fire Agencies agree to consider expansion of this Agreement to cover areas of mutual concern, e.g., changing technology and improved procedures, as opportunities for such cooperation become available.

## 12.0 WAIVER.

Each party to this agreement does hereby expressly waive all claims against the other party for compensation for any loss, damage, personal injury or death occurring in consequence of the performance of this agreement.

## 13.0 PRINCIPAL CONTACTS.

The Points of Contact are responsible for coordinating an annual review of the currency and adequacy of this Agreement among the signatories, and/or their designees.

National Weather Service:

National Fire Weather Program Manager
Rusty Billingsley
National Weather Service
3833 South Development Ave.
Boise, ID 83705
208/334-9824 – Office
david.billingsley@ noaa.gov

Interagency Wildland Fire Agencies:

NIFC Fire Weather Program Manager
Rick Ochoa
National Interagency Fire Center
3833 South Development Ave.
Boise, ID 83705
208/387-5451-Office
rick_ochoa@ nifc.blm.gov

## 14.0 DEFINITIONS.

When the following terms are used in this Agreement, or in an AOP, such terms will have the meanings stated below.

A. **Annual Operation Plan for Fire Weather Services (AOP)**: A procedural guide, based on the National Interagency MOU and applicable Geographic Area MOUs, which describes fire meteorological services provided within the Geographic Area of responsibility, including NIFC. At a minimum the AOP will include the items in Appendix 1, *Annual Operating Plan - Required Elements and Suggested Format.*

B. **Assessment:** Fire weather and/or fire danger product based on a thorough evaluation of all pertinent sources of meteorological and fire danger information.

C. **Basic Meteorological Services:** Basic meteorological services are those state-of-the-science meteorological forecasts, warnings, observations and statements produced at a designated NWS office.

D. **Fire Weather Watch:** Fire Weather Watch is issued to advise of conditions, which could result in extensive wildfire occurrence or extreme fire behavior, which are expected to develop in the next 12 to 48 hours, but not more than 72 hours. In cases of dry lightning, a Fire Weather Watch may be issued for the next 12 hours. Fire Weather Watch meteorological and fuel criteria will be defined in the AOP.

E. **Geographic Area:** A geographic boundary designated by Interagency Wildland Fire Agencies, where these agencies work together in the coordination and effective utilization of resources within their boundaries. The National Interagency Mobilization Guide identifies the areas encompassed by the eleven Geographic Areas.

F. **Geographic Area Memorandum of Understanding (MOU):** A document, based on the National Interagency Memorandum of Understanding for Meteorological Services, which establishes local policy to meet unique needs of a Geographic Area.

G. **Incident Meteorologist (IMET)**: A meteorologist specially trained to provide on-site meteorological support of Wildland Fire Agency designated incidents.

H. **Non-Routine Services**: Meteorological services uniquely required by interagency Wildland Fire Agencies, which usually are not provided from a designated NWS office.

I. **On-Site Meteorological Services:** Special service which dedicates an IMET to an incident so that they are removed from their normal duties.

J. **Predictive Services:** Those Geographic Area/national level fire weather and/or fire danger services and products produced by Wildland Fire Agency meteorologists in support of resource allocation and prioritization.

K. **Red Flag Warning**: Red Flag Warning is used to warn of impending or actually occurring critical weather conditions that could result in extensive wildland fire activity. A warning will be issued when the forecast time of onset is less than 24 hours. Red Flag Warning meteorological and fuel criteria will be defined in the AOP.

L. **Routine Fire Weather Forecasts**: A Routine Fire Weather Forecast is a scheduled narrative and/or matrix forecast of weather parameters pertinent fire management activities in support of protection of life, property, and resources at risk in a given area. The number of parameters may vary due to regional weather requirements, but normally include a brief weather synopsis, expected weather and clouds, duration of precipitation, maximum and minimum temperature/relative humidity, wind direction and speed, transport and stability parameters, and lightning activity level. These forecasts normally cover the next 48 hours and may include input for the computation of National Fire Danger Rating System indices. These forecasts may also include long-range outlooks.

M. **Site Specific Forecasts:** Site-specific forecasts are issued when requested by Interagency Wildland Fire Agencies for wildland fires. These forecasts differ from routine fire weather forecasts by incorporating greater detail in timing, higher resolution of terrain influences, and incorporate meso-scale and sometimes micro-scale weather influences impacting the site. These may be generated from an office with Wildland Fire supplied information (i.e., location, weather observations, objectives) or generated by an IMET assigned to the incident. Forecast formats may vary but all are highly tailored to satisfy requirements of the incident objectives.

N. **Wildland Fires:** All ignitions that occur on wildlands.

## 15.0 SIGNATORY.

This Agreement shall be effective on the date the last signature is placed on the signature section and it will remain in effect for a period of five-years from the date of the last signature.

/signed/ 9/26/02
Gregory A. Mandt, Director Date
Office of Climate, Water and Weather Services

/signed/ 10/9/02
Byron J. Green, Contracting Officer Date
Bureau of Indian Affairs

/signed/ James W. Kurth, for 10/24/02
Dan Ashe, Chief, National Wildlife Refuge System Date
Fish and Wildlife Service

/signed/ 10/30/02
Donna Kalvels, Chief, Contract Office Date
National Park Service

/signed/ 9/30/02
Larry Hamilton, Director Date
Bureau of Land Management-Office of Fire & Aviation

/signed/ 10/31/02
Richard A. Harter, Supervisory Contract Officer Date
Bureau of Land Management-Office of Fire & Aviation

/signed/, Roger Spaulding, for 9/30/02
Phil Street, Director Date
DOI-Fish and Wildlife Service

/signed/ 9/30/02
Jim Stires, Fire Director Date
DOI-Bureau of Indian Affairs

/signed/ 9/30/02
Sue Vap, National Fire Management Officer Date
DOI-National Park Service

/signed/ 9/30/02
Alice Forbes, Acting Director Date
USDA, Forest Service-NIFC

/signed/ 9/30/02
Tory Majors, Administrative Officer Date
USDA, Forest Service-NIFC

Appendix 1
Annual Operating Plan
Required Elements and Suggested Format

I. INTRODUCTION

The introduction will include a general statement of purpose and an explanation of the relationship between the Annual Operating Plan (AOP) and the Geographic Area Coordinating Center Memorandum of Understanding (MOU) for Meteorological Services, and the Geographic Area Mobilization Guide and/or the National Mobilization Guide will be referenced.

II. SERVICE AREA AND ORGANIZATIONAL DIRECTORY

A. List of weather offices and points of contact

B. List of agencies participating

III. SERVICES PROVIDED BY THE NATIONAL WEATHER SERVICE

A. Basic Services

1. Routine fire weather forecasts
   a. Issuance (seasonal, daily)
   b. How forecast is issued and accessed
   c. Content of the forecast

2. Site-specific wildland fire forecasts
   a. Criteria
   b. Contents
   c. Procedures

3. Fire Weather Watch, Red Flag Programs
   a. Criteria
   b. Contents
   c. Procedures

4. Participation in interagency groups.

B. Special Services. Procedures for obtaining and billing for special services.

C. Training. Procedures for obtaining and billing for special services.

IV. WILDLAND FIRE AGENCY RESPONSIBILITIES

A. Operational support and predictive services.
   1. Program management
   2. Monitoring, feedback and improvement
   3. Technology transfer
   4. Agency computer systems
   5. Fire weather observations
   6. On-site support
   7. Training

V. JOINT RESPONSIBILITIES

Negotiate service boundaries and fire weather forecast zones to meet customer and forecaster need.

VI. EFFECTIVE DATES ON THE AOP

VII. SIGNATURE PAGE

VIII. APPENDICES

A. Interagency Agreement for Meteorological Services in Support of Agencies with Land and Fire Management Responsibilities

B. Fire weather zone maps.

C. Catalog of fire weather observation sites.

## WEATHER TERMINOLOGY

In general, terms used in fire-weather discussion and summaries are plain language 'dictionary' words. There are, however, a few terms which have a meteorological connotation not covered by the standard dictionary definition. These are defined below:

**Advection:** The transfer of atmospheric properties by horizontal movement of air. Most commonly used in reference to transfer of warmer or colder air.

**Dry Thunderstorm:** A lightning storm accompanied by less than a wetting rain, 0.10 inch precipitation or less, often with very gusty winds.

**Front:** (cold, warm, or stationary) A zone of temperature and density discontinuity between two air masses.

**Gradient:** (pressure gradient) Change of value of the atmospheric pressure per unit of distance. The greater the change per unit of distance, the stronger the gradient, and the stronger the winds.

**High:** An area of high-atmospheric pressure delineated by closed isobars.

**Instability:** (unstable air mass) A state in which the vertical distribution of temperature is such that an air particle, if given either an upward or downward impulse, will tend to move away with increasing speed from its original level. Thunderstorm development would be an example of an unstable air mass.

**Low:** (depression, cell, disturbance) An area of low atmospheric pressure delineated by closed isobars (lines of equal pressure).

**Low Aloft:** (cold low, cold low aloft, upper-level low) Same as low above, except occurring in the upper atmosphere and characterized by moist, unstable and abnormally cooler temperatures aloft.

**Ridge:** (high-pressure ridge) An elongated area of relatively high atmospheric pressure.

**Ridge Aloft:** The same as ridge but occurring in the upper atmosphere. When a ridge is strong and persistent, it is often associated with warm and dry subsiding air.

**Stability:** (stable air mass) A state in which the vertical distribution of temperature is such that an air particle will resist displacement from its level. An inversion is an example of a very stable condition.

**Subsidence:** (subsiding air) A descending motion of air in the atmosphere.

**Temperature Inversion:** (inversion) A layer in which the temperature increases with altitude.

**Thermal low:** (heat low) A low pressure system caused by intensive heating at the earth's surface. Not associated with frontal systems. Occurs under high-pressure aloft and remains stationary.

**Trough (Trof):** An elongated area of relatively low atmospheric pressure. The axis of a trough is the trough line. Fronts are often located in the trough line at the surface.

**Upper-level Trough:** (upper trough, trough aloft) A pressure trough existing in the upper atmosphere.

# LIGHTNING ACTIVITY LEVEL GUIDE

The lightning activity level guide for observers describes clouds, storm and lightning frequency criteria for classifying lightning events. Because the objective is to describe the lightning activity, lightning counts take precedence over the cloud-storm-rain narrative description. For instance, if the clouds should fit the LAL 3 descriptive criteria, but the lightning averages three cloud-to-ground discharges per minute, the LAL should be classified as a 4.

Also included in the lightning activity level guide for observers is the relative frequency of occurrence of the various LAL. For instance, LAL 6 is a rare event not likely to occur on more than 1 or 2 percent of the lightning days.

The observation of lightning (the LAL) should include what has happened within a 25 to 30-mile radius of the station.

The fire weather observer must obtain as much information as possible from all available sources to insure an accurate LAL observation. The fire weather forecaster has other sources of information on thunderstorm activity, and therefore, should be consulted if there is confusion over the selection of an LAL.

**Lightning Activity Level Guide for Weather Observers**

| | | Individual Storm Cell Cloud to Ground Lightning Discharge (cg) | | | |
|---|---|---|---|---|---|
| LAL | Cloud & Storm Development | Counts cg/5 min | Counts cg/15 min | Avg. cg/min | % of T-storm Days |
| 1 | No T-storms | - | - | - | -- |
| 2 | Cumulus clouds are common but only a few reach the towering cumulus stage. A single thunderstorm must be confirmed in the observation area. The clouds produce mainly virga, but light rain will occasionally reach the ground. Lightning is very infrequent. | 1-5 | 1-8 | | 10 |
| 3 | Towering cumulus covers less than two-tenths of the sky. Thunderstorms are few, but two to three must occur within the observation area. Light to moderate rain will reach the ground, and lighting is infrequent. | 6-10 | 9-15 | 1-2 | 35 |
| 4 | Towering cumulus covers two to three-tenths of the sky. Thunderstorms are scattered and more than three must occur within the observation area. Moderate rain is common and lightning is frequent. | 11-15 | 16-25 | 2-3 | 35 |
| 5 | Towering cumulus and thunderstorms are numerous. They cover more than three-tenths and occasionally obscure the sky. Rain is moderate to heavy and lightning is frequent and intense. | >15 | >25 | >3 | 18 |
| 6 | Similar to LAL 3 except thunderstorms are dry. | | | | <2 |

# Map of Fire Weather Districts